Product Description — Tobii Glasses 2

Tobii Glasses Head Unit
Tobii Glasses Recording Unit
Tobii Glasses Controller Software

Product Description — Tobii Glasses 2

Version 1.0.1
06/2014
All rights reserved.
© Tobii Technology AB

The information contained in this document is proprietary to Tobii Technology. Any reproduction in part or whole without prior written authorization by Tobii Technology is prohibited.

Products that are referred to in this document may be either trademarks and/or registered trademarks of the respective owners. The publisher and the author make no claim to these trademarks.

While every precaution has been taken in the preparation of this document, the publisher and the author assume no responsibility for errors or omissions, or for damages resulting from the use of information contained in this document or from the use of programs and source code that may accompany it. In no event shall the publisher and the author be liable for any loss of profit or any other commercial damage caused or alleged to have been caused directly or indirectly by this document.

Content subject to change without notice.

Please check Tobii web site www.tobii.com for updated versions of this document.

Table of Contents

1 Introduction 1
2 System overview 2
2.1 Tobii Glasses 2 Head Unit 3
2.2 Tobii Glasses 2 Recording Unit 3
3 Technical Specifications 4
3.1 Eye Tracking 4
3.2 Glasses Head Unit 4
3.3 Recording Unit 4
3.4 Compliance 5
3.5 Compatible Software 5
3.6 Glasses Controller Software — Feature overview 5
3.7 Glasses Controller Software — Minimum System requirements 5
4 Tobii Glasses 2 Packages 6
Appendix ASafety and Compliance 7

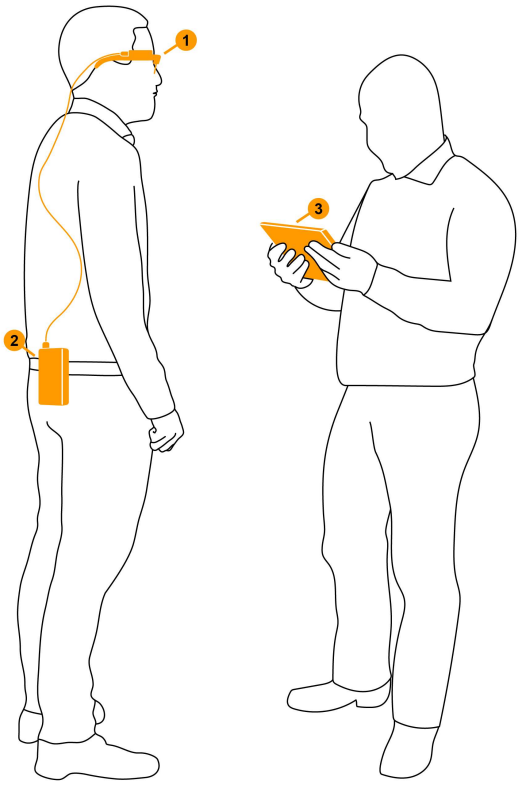
1 Introduction

Tobii Glasses 2 is the next generation wearable eye tracking tool which gives researchers the possibility to capture truly objective and deep insights into human behavior in any real-world environments. Tobii Glasses 2 shows exactly what a person is looking at in real time while the test person moves freely in a lab, shop, a restaurant or any locations. The product consist of a head unit, a recording unit and the Tobii Glasses Controller Software. This document describes the main technical features of the Tobii Glasses 2 product.

This document applies to release 1.0 of the Tobii Glasses 2. This product is continuously being developed and refined. Please visit www.tobii.com for the most recent specifications for the software and for the latest version of this document.

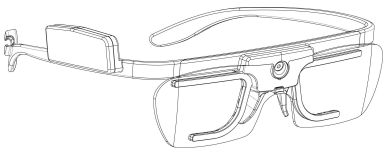
2 System overview

The Tobii Glasses 2 system consists of several parts described below.

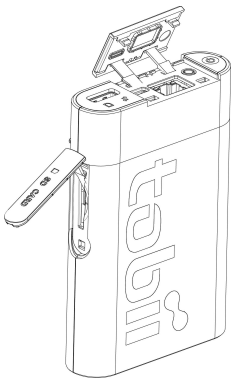


The system includes:

1. A wearable eye tracker (glasses), referred to as the Head Unit.



2. A Recording Unit, connected to the Head Unit via an HDMI cable. The Recording Unit carries the battery and stores the recorded data on an SD-card. The Recording Unit is controlled from a tablet or computer running the Tobii Glasses Controller Software.

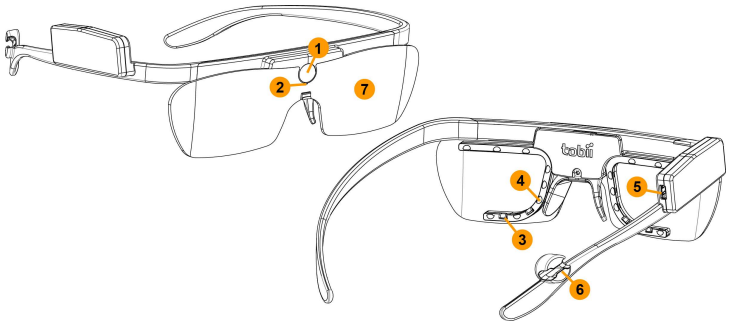


3. A Windows 7 or Windows 8 tablet or computer running the Tobii Controller Software. Tobii Glasses Controller allows for managing participants, controlling of the eye tracker and for viewing of both real-time and recorded eye tracking data. Tobii Glasses Controller connects to the eye tracker through an Ethernet connection.
4. Tobii Glasses Analysis Software (optional) installed on a Windows computer. Any eye tracking analysis beyond qualitative analysis of eye tracking session replay, is carried out using Tobii Glasses Analysis Software.

2.1 Tobii Glasses 2 Head Unit

The Head Unit is a highly sophisticated measurement device. It consists of several very sensitive sensors and it must be cared for according to instructions for it to work properly.

The Head Unit consists of the following parts:

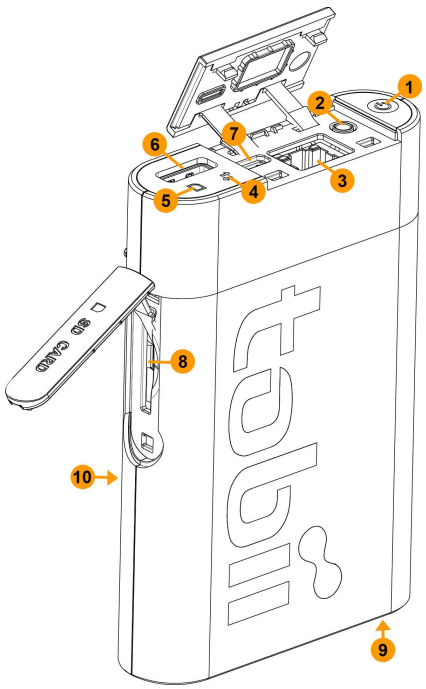


1. **High definition scene camera** – Captures a high definition video of what is in front of the participant.
2. **Microphone** – Picks up sound from the participant and its surroundings.
3. **Eye tracking cameras** – Records the eye orientation e.g. the direction of the eye gaze.
4. **IR illuminators** – Illuminates the eyes to support the eye tracking sensors
5. **Micro HDMI connector** – Connects to Tobii Glasses Recording Unit via provided HDMI cable.
6. **Cable guide** – Guides the HDMI cable towards the participant's back.
7. **Cover glasses**

2.2 Tobii Glasses 2 Recording Unit

The Recording Unit is a small computer that controls the Head Unit (the eye tracking glasses), records and stores eye tracking data, sound and scene camera video on a removable SD-card. The Recording Unit carries a replaceable and rechargeable Li-Ion battery that feeds both the Recording Unit and the Head Unit with power. The Recording Unit has several connectors and a power button. The Recording Unit is controlled from a tablet or computer running the Tobii Controller Software and connected to the Recording Unit via Ethernet cable.

The Recording Unit consists of the following parts:



1. **Power button & power LED indicator** - Changes the device power states (on/off). LED indicates state.
2. **3.5 mm connector**
3. **LAN connector** – Connects to a tablet or computer running Tobii Controller Software, via provided LAN Cable.
4. **Status LED** (available in future firmware releases)
5. **SD card activity LED** (available in future firmware releases)
6. **HDMI connector** – Connects to Tobii Glasses 2 Head Unit via provided HDMI cable.
7. **Micro USB connector**
8. **SD card slot** – Used for SD cards according to specifications.
9. **Battery compartment** – Holds the battery for the Recording Unit and the Glasses Head Unit
10. **Belt clip** – For attaching the Recording Unit to participant's belt.

3 Technical Specifications

3.1 Eye Tracking

Eye tracking technique	Corneal reflection, dark pupil
Binocular eye tracking	Yes
Sampling rate	30 Hz
Calibration procedure	1 point
Parallax compensation tool	Automatic
Slippage compensation	Yes, 3D eye tracking model
Pupil measurement	Yes, absolute measure

3.2 Glasses Head Unit

Material	Grilamid plastic, stainless steel, aluminum
Glasses lens	Plastic, in 2 colors: clear and sunshade
Interchangeable lenses	Yes
Nose pad	Grilamid plastic, interchangeable
Scene camera, video resolution	1920 ×1080 at 30 fps
Scene camera, video format	H.264
Scene camera, field of view	90 deg. 16:9 format
Scene camera Horizontal and vertical FOV (approx.)	82 deg. horizontal / 48 deg. vertical
Weight	45 grams including cover glass
Frame dimensions (width ×depth ×height)	179 ×159 ×57 mm
Cable length	1200 mm
Visual field of view (frame obstruction)	More than 160 deg. horizontially, 70 deg. vertically
Audio	Integrated microphone
Design characteristics	Light and discrete
Number of eye cameras	4 cameras
Fixed geometry	Yes
Sensors	Gyroscope and accelerometer (available in future firmware releases)

3.3 Recording Unit

Battery recording time	120 min.
Battery type	Rechargeable 18650 Li-lion, Capacity: 3 400 mAh
Storage Media	SD (SDXC) card
Connectors	HDMI, Mini USB, 3.5 mm jack
Dimensions (height x width x depth)	130 x 85 x 22 mm
Weight	230 grams

3.4 Compliance

Ingress protection	IP class 20
EC - European Union	Yes
FCC - USA	Yes
CCC - China	Yes
VCCI - Japan	Yes
Eye Safety (EN 62471:2008)	Yes
Underwriters Lab US (UL 60960)	Yes

3.5 Compatible Software

Recording and live viewing	Tobii Glasses Controller Software
Data analysis and export	Tobii Glasses Analysis Software

3.6 Glasses Controller Software — Feature overview

- Manage participants
- Manage recordings
- Live viewing of recordings
- Instant replay of recordings
- Simple calibration

3.7 Glasses Controller Software — Minimum System requirements

Operating System: Windows 7, Windows 8, Windows 8.1 (32 bit and 64 bit)

CPU: Intel Atom 1,8 GHz

Resolution: 1024 ×768

Memory: 2 GB

4 Tobii Glasses 2 Packages

Components	Live View	Live View Wireless	Premium	Subscription
Head Unit	•	•	•	•
Recording Unit	•	•	•	•
HDMI cable	•	•	•	•
Front glass (2 pcs) - 1 clear & 1 sun shade	•	•	•	•
Nose pads (4 pcs)	•	•	•	•
Head strap	•	•	•	•
Cleaning cloth	•	•	•	•
Calibration target - plastic	•	•	•	•
Batteries (4 pcs)	•	•	•	•
SD cards (3 pcs) + sleeve	•	•	•	•
Quick start guide	•	•	•	•
User Manual (pdf)	•	•	•	•
Battery charger + cable	•	•	•	•
Calibration target - stickers	•	•	•	•
Glasses Controller Software	•	•	•	•
Glasses Analysis Software[1]			•	•
Ethernet cable	•	•	•	•
WiFi (available in future firmware releases)		•	•	•
Windows 8 Pro tablet			•	
One day onsite installation and startup training[1]			•	
Tobii Care[1]			•	

1. See separate product description for details.

Appendix A Safety and Compliance

A1 Safety and Usage

A1.1 Usage Warning

The Tobii Glasses 2 system is composed of several components described in the user manual and should be used according to the manufacturer instructions. Connecting, or by other means using any other component than advised in the user manual may damage or injure a person or its property or recorded data, and is done entirely at the user's own risk.

The Tobii Glasses 2 Eye Tracker should be fitted on the test participant according to manufacturer instructions. Tobii or its agents are not liable for damage or injuries to a person or its property due to a Tobii Glasses 2 Eye Tracker falling from any configuration. Fitting the Tobii Glasses 2 onto any test participant is done entirely at the user's own risk.

Tobii Glasses 2 are equipped with an elastic head strap to enable tighter mounting of the Eye Tracker onto the wearers head. Tobii or its agents are not liable for damage or injuries to a person or its property due to the head strap of the Tobii Glasses 2 Head Unit.

A1.2 Emergency Warning

The Tobii Glasses 2 solution is only to be used for research purposes. Be aware that due to the low, but possible, risk of failure, the Tobii Glasses 2 should not be relied upon as an audio communications, or an environmental control device, as well as in dangerous, or otherwise important, situations.

A1.3 Child Safety

The Tobii Glasses 2 solution is an advanced computer system and electronic device. As such it is composed of numerous separate, assembled parts. In the hands of a child certain of these parts have the possibility of being separated from the device, possibly constituting a choking hazard or another danger to the child.

Young children should not have access to, or the use of, the device without parental or guardian supervision.

A1.4 Infrared Warning

When activated, the Tobii Glasses 2 Eye Tracker Head Unit emits pulsed infrared (IR) light. Certain medical and other devices are susceptible to disturbance by IR light and/or radiation. Do not use the Tobii Glasses 2 solution when in the vicinity of such susceptible devices as their accuracy or proper functionality could be inhibited.

A1.5 Epilepsy Warning

Some people with Photosensitive Epilepsy are susceptible to epileptic seizures or loss of consciousness when exposed to certain flashing lights or light patterns in everyday life. This may happen even if the person has no medical history of epilepsy or has never had any epileptic seizures.

A person with Photosensitive Epilepsy would also be likely to have problems with TV screens, some arcade games, and flickering fluorescent bulbs. Such people may have a seizure while watching certain images or patterns on a monitor, or even when exposed to the light sources of an eye tracker. It is estimated that about 3-5 % of people with epilepsy have this type of Photosensitive Epilepsy. Many people with Photosensitive Epilepsy experience an "aura" or feel odd sensations before the seizure occurs. If you or the wearer of the Tobii Glasses 2 Eye Tracker feel odd during use, turn off and remove the Tobii Glasses 2 Head Unit.

A1.6 Mechanical Shock Warning

The Tobii Glasses 2 solution is a delicate measurement instrument used for research purposes and should be treated with care at all times. In order to avoid breaking or damaging the internal electronic circuits, do not drop, knock, or shake the device. Eye tracking quality or accuracy can be seriously affected if the Tobii Glasses 2 Head Unit or Recording Unit have been dropped. If the eye tracker is exposed to mechanical shock, for example, when dropped, do not try to start it or connect it to a power source. Contact Tobii Support for instructions (contact information can be found on the back of this document).

A1.7 Bending Warning

In order to avoid breaking or damaging the internal electronic circuits, do not bend any part of the eye tracking system other than the flexible ear pieces on either side of the glasses. Eye tracking quality or accuracy can be seriously affected if the Tobii Glasses 2 Head Unit or Recording Unit have been bent.

A1.8 Do not open the devices

Do not open the Tobii Glasses 2 Head Unit or the Recording Unit. Non-compliance will result in loss of Warranty! There are no user serviceable components inside. Contact Tobii technical support if your Tobii Glasses 2 product is not working properly.

A1.9 Connectors

The Tobii Glasses 2 Head Unit and Recording Unit has numerous external interfaces (connectors). Connecting any other device or connector than intended may cause personal injuries and/or damage the Tobii Glasses 2. Tobii or its agents are not liable for any damages or injuries to a person or its property due to connecting unintended connectors.

A1.10 Environment

The Tobii Glasses 2 system is designed for use in dry indoor environments. Avoid any exposure to direct sunlight as this will affect eye tracking quality and can overheat the equipment with longer exposure. Avoid exposure to any liquids, moist, rain, sweat or other damp materials or environments. Do not use the eye tracker near water — the device is not water resistant.

The device complies with IP class 20 and has no protection against objects smaller than 5 mm. Keep the eye tracker in a clean and dust-free environment. When using the equipment take adequate precautions against dust and dirt.

Do not place or use the equipment in places subject to extreme temperatures and humidity, such as on top and or near a heating element, in a hot room or in a damp room. Usage temperature: 0°C to +30°C / 32°F to 86°F

A1.11 Battery Warning

The Tobii Glasses 2 solution includes rechargeable Lithium-ion batteries. Lithium-ion batteries can explode or cause a fire if they are used or charged incorrectly or if they are defective.

Do not short-circuit the battery poles. Do not expose the battery to water or humidity. Do not expose the batteries to heat, direct sunlight. solder or fire. Immediately disconnect the batteries if, during operation, they emit an unusual smell, develop heat, change shape/geometry, or behave abnormally. Do not use any defective batteries.

To recharge the batteries, use a battery charger specifically designed for the purpose and observe the recharging conditions specified by the manufacturer of the charger. Charge the batteries under supervision and do not place combustible materials close to or on top of the batteries or the charger, this may result in overheating, explosion or fire.

A1.12 Transportation

Always use the supplied casing and packaging material to transport the eye tracking equipment and provide added protection.

A1.13 Accessories

Only use accessories provided by or approved by Tobii.

A1.14 Cleaning

Before cleaning any part of the Tobii Glasses solution, unplug the power cord from the outlet and make sure the device is turned off. Both Tobii Glasses 2 Head Unit and Recording Unit have surface coatings that require special care. Only use the supplied micro-fiber cleaning cloth or similar products specially intended for cleaning screens or glass with a special coating. Avoid touching or scratching the glass and the eye tracking cameras and illuminators on the Tobii Glasses 2 Head Unit and keep the surface clean. If the surfaces are dusty or damaged, eye tracking quality may be degraded.

A1.15 Disposal

Do not dispose of the device in general household or office waste. Follow your local regulations for disposal of electrical and electronic equipment.

A2 Compliance Information

CE All Tobii Glasses 2 are CE-marked, indicating compliance with the essential health and safety requirements set out in European Directives.

A2.1 Federal Communication Commission Interference Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into a wall outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or experienced radio/TV technician for assistance.

A2.2 FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 1 cm between the radiator & your body.

This is best achieved by wearing the Tobii Glasses 2 Recording Unit in its belt clip as shown in the illustration.

A2.3 Canadian Compliance Statement

This Class B digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

A2.4 EU Compliance Statement

Tobii Technology AB declares that this device is in compliance with the essential requirements and other relevant provisions of the R&TTE and EMF Directive.

A2.5 Declaration of Conformity (Standards)

The Tobii Glasses 2 Recording unit and its handling comply with the following standards:

- EMC Emission: EN55022:2010 Class B, FCC part 15, Class B
- EMC Immunity: EN55024:2010
- SAR EN62311:2008
- Low Voltage Directive 2006/95/EEG
- EMC Directive 2004/108/EC
- Radio and Telecommunications Terminal Equipment Directive (R&TTE) 1999/5/EC
- RoHS Directive 2002/95/EC
- RoHS2 Directive 2006/121/EC
- WEEE Directive 2002/96/EC
- Reach Directive 2006/121/EC
- China RoHS Directive
- CFR 47 (FCC) part 15, Class B
- Canadian ICES-003
- Japan TCM mark (WLAN) [Ref 4]
- Japan VCCI mark
- IEC/EN/UL60950-1:2005 (Electrical safety for global/EU/US)

A2.6 WLAN radio information (frequencies and channels)

Built-in radio transmitters and receivers operate at the following frequencies:

WLAN 2.4GHz band:

Channel 1-11 (2412-2462MHz) (Europe, USA, Japan, China)

WLAN 5GHz band:

Band UNII-1: Channel 36, 40, 44, 48 (5180-5240MHz) (Europe, USA, Japan, China)

Band UNII-3: Channel 149,153,157,161,165 (5745-5825MHz) (USA, Japan, China)

Tobii Support

EUROPE / GLOBAL
Phone (SWE): +46 8 522 950 10
Phone (GER): +49 69 24 75 03 4-27
support@tobii.com
Support hours: 8 am - 6 pm
Between July-August: 9am - 5pm
(Central European Time, GMT +1)

NORTH AMERICA
Phone: +1 703 738 1320

support.us@tobii.com
Support hours: 8 am - 8 pm
(US Eastern Standard Time, GMT -6)

JAPAN
Phone: +81 3 5793 3316

support.jp@tobii.com
Support hours: 9 am - 5.30 pm
(Japan Standard Time, GMT +9)

CHINA
Phone: +86 180 1558 5168

support.cn@tobii.com

©Tobii®. Illustrations and specifications do not necessarily apply to products and services offered in each local market. Technical specifications are subject to change without prior notice. All other trademarks are the property of their respective owners.

Tobii Headquarters (EMEA)
Tobii Technology AB
Karlsrovägen 2D
S-182 53 Danderyd
Sweden

Phone : +46 8 663 69 90
Fax: +46 8 30 14 00
www.tobii.com
sales@tobii.com

CENTRAL EUROPE
Tobii Technology GmbH
Barckhausstr. 1
D-60325 Frankfurt am Main
Germany

Phone: +49 69 24 75 03 40
Fax: +49 69 24 75 03 429
www.tobii.com
sales.de@tobii.com

CHINA
Tobii China - Sales Office
Room E2, 29/F
Shanghai Industrial Investment Building
No. 18 Caoxi North Road
Shanghai, China
Mobile: +86 180 1558 6966

www.tobii.com
sales.cn@tobii.com

JAPAN
Tobii Technology Japan, Ltd
5-23-7 Higashigotanda, Shinagawa-ku
Tokyo 141-0022
Japan

Phone: +81-3-5793-3316
Fax: +81-3-5793-3317
www.tobii.com
sales.jp@tobii.com

NORTH AMERICA
Tobii Technology, Inc.
510 N, Washington Street, Suite 200
Fall Church VA 22046
USA
Toll-Free: +1-888-898-6244
Phone: +1-703-738-1300
Fax: +1-703-738-1313
www.tobii.com
sales.us@tobii.com